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A W-Band Pulsed ENDOR Spectrometer: Setup and Application to Transition Metal Centers

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Abstract

The design and performance of a 95 GHz pulsed W-band EPR/ ENDOR spectrometer is described with emphasis on the ENDOR part. Its unique feature is the easy and fast sample exchange at 4.2 K for frozen solution and single crystal samples. In addition, the microwave bridge power output is relatively high (maximum 267 mW), which allows the application of short microwave pulses. This increases the sensitivity in echo experiments because of the broader excitation bandwidth and the possibility of employing short pulse intervals, as long as the dead time does not increase significantly with the power. The spectrometer features two microwave and radiofrequency (0.1-220 MHz, 3 kW pulse power) channels and a 6 T superconducting magnet in a solenoid configuration. The magnet is equipped with cryogenic sweep coils providing a sweep range of ±0.4 and ±0.2 T for a center field of 0-4 and 4-6 T, respectively. The spectrometer performance is demonstrated on Cu(II) centers in single crystals, a zeolite polycrystalline sample, and a protein frozen solution. © 1999 Academic Press.

Keywords

High field, Pulsed ENDOR, Pulsed EPR, W-band